

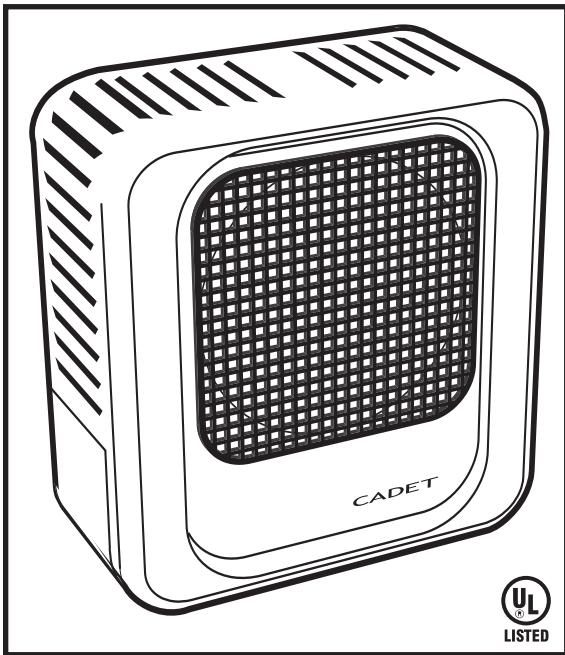


SAFETY & QUALITY

# The CEH Industrial Unit Heater

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## OWNER'S GUIDE



Tools Required:  
Appropriate Fasteners  
Crescent Wrench  
Phillips Screwdriver

Straight Screwdriver  
Strain Relief Connector  
Wire Strippers

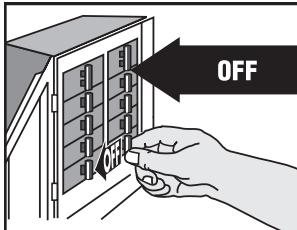
### Features & Benefits

- Commercial grade high temperature manual reset
- High mass, tubular element for longer life
- Fan delay eliminates cold draft on startup and disperses residual heat on shutdown
- Rugged die formed construction for durability
- Wire single or three phase to suit the application
- Vertical or horizontal delivery
- 5 Year Warranty

Models:	CEH-003RB	CEH-005P
CEH-003M	CEH-003R	CEH-005PB
CEH-003MB	CEH-003SB	CEH-005R
CEH-003P	CEH-005M	CEH-005SB
CEH-003PB	CEH-005MB	

• Recommended for elevations under 7500 feet

### IMPORTANT INSTRUCTIONS



#### ⚠ WARNING

Turn the electrical power off at the electrical panel board (circuit breaker or fuse box) and lock or tag the panel board door to prevent someone from turning on power while you are working on the heater. Failure to do so could result in serious electrical shock, burns, or possible death.

1. Read all instructions before using this heater.
2. Read all information labels. Verify that the electrical supply wires are the same voltage as the heater.
3. All electrical work and materials must comply with the National Electric Code (NEC), the Occupational Safety and Health Act (OSHA), and all state and local codes.
4. If you need to install a new circuit or need additional wiring information, consult a qualified electrician.
5. Protect electrical supply from kinks, sharp objects, oil, grease, hot surfaces or chemicals.
6. Do not install heater below an electrical convenience receptacle.

#### 7. ⚠ WARNING

Overheating or fire may occur. DO NOT place the heater behind doors.

#### 8. ⚠ WARNING

Fire or explosion may occur. DO NOT place heater in any area where combustible vapors, gases, liquids, or excessive lint or dust are present.

#### 9. ⚠ WARNING

Burn Hazard. This heater is hot when in use. To avoid burns, do not let bare skin touch hot surfaces. Use extreme caution when any heater is used by or near children or invalids.

#### 10. ⚠ WARNING

Risk of Electrical Shock. Connect grounding lead to grounding terminal provided. Keep all foreign objects out of heater.

#### 11. ⚠ WARNING

Risk of Fire. Do not block heater. Heater must be kept clear of all obstructions: maintain a 3 feet minimum clearance in front, 12 inches on each side, and 6 inches from the rear. Heater must be kept clean of lint, dirt and debris (See Maintenance Instructions)

### SAVE THESE INSTRUCTIONS

## READ ALL INSTRUCTIONS AND SAFETY INFORMATION.

**!WARNING!** When working with electricity, turn the electrical power off at the electrical panel board and lock or tag the circuit breaker door. Failure to do so could result in serious electrical shock, burns, or possible death.

**!WARNING!** Risk of Fire. Heaters must be kept clean of lint, dirt and debris.

Failure to follow warnings may cause heater to eject sparks, ignite materials, or cause electrical shock.

## Installation Instructions

**PLACEMENT:** Install the CEH unit heater vertically or horizontally. Brackets are also available for ceiling mount or wall mount applications.

**THERMOSTAT:** A line voltage OR low voltage thermostat is required for operation. A Cadet wall thermostat is recommended for ultimate control and comfort.

### Horizontal Delivery

Heaters should be located so that the air streams of the individual units "wipe" the exposed walls of the building without blowing directly against the wall. Recommended spacing between the units is 12 feet. Locate heaters so their air streams are not subjected to interference from columns, partitions, machinery, etc.

(See Figure 1)

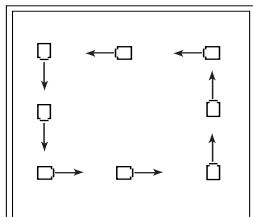


Figure 1.

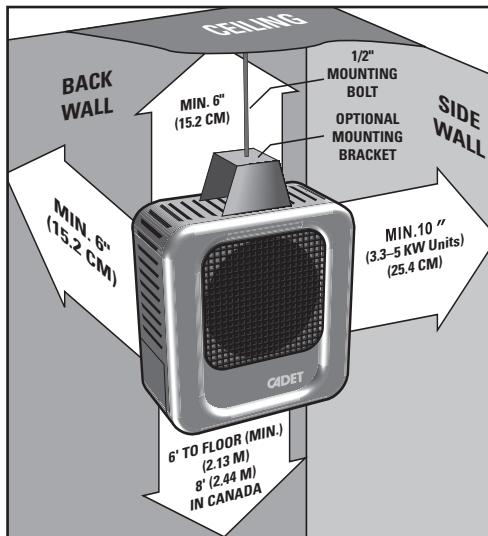


Figure 2. Horizontal mounting clearances with optional bracket (CEK-M1).

MAXIMUM MOUNTING HEIGHT (TO BOTTOM OF UNIT)		
MODEL	HORIZONTAL DISCHARGE	VERTICAL DISCHARGE
CEH-003	9'	10'
CEH-005	9'	10'

### General Safety Information

The ceiling or wall on which the heater is to be mounted must be of adequate strength to support the heater. Plaster or suspended ceilings will not support this type of heater. For greater stability, we recommend the use of threaded rods.

Do not mount the heater where volatile liquids or gases will be present or where it will be exposed to rain or mist. All combustible materials should be kept at least 3 feet away from front of the heater.

In an area where the air temperature will be maintained at less than 68°F, the heater should be mounted in a position that will not blow directly on people working in the area.

A minimum clearance for each heater (both horizontal and vertical mount) is listed in Figure 2. Please follow these recommendations to avoid potential problems with the function and safety of the heater.

### Mounting the CEH Unit Heater

**CAUTION: THE CEILING OR WALL MOUNTING STRUCTURE AND ANCHORING PROVISIONS MUST BE OF SUFFICIENT STRENGTH TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKETS**

#### Horizontal Discharge

(See Figure 2 for minimum clearances)

1. Mounting with rod from ceiling or superstructure: (Figure 3)
  - a. Remove the four factory installed bolts from the top of the unit and screw them into the threaded holes in the back.
  - b. Install four 5/16-18 threaded rods in holes and secure in place using lock (jam) nuts. (Figure 3)
  - c. Attach the four mounting rods to the ceiling or overhead structure and anchor securely.
2. Mounting with optional bolt-on ceiling brackets: (Figure 2)
  - a. Bolt mounting bracket on top of unit using the four factory installed bolts.
  - b. Suspend the unit from ceiling or overhead structure using a 1/2 inch threaded rod or bolt, allowing a minimum 6 inches clearance from the ceiling. Using lock (jam) nut, anchor securely.
3. Mounting with optional wall hanger arm and mounting bracket: (See Parts List items #10 & #11)
  - a. Bolt mounting bracket on top of unit using four factory installed bolts.
  - b. Attach the wall hanger arm to wall using four 3/8 inch bolts or masonry fasteners.
  - c. Suspend the unit from hanger arm using 1/2 inch bolt. Place the rubber washer provided between the mounting brackets.

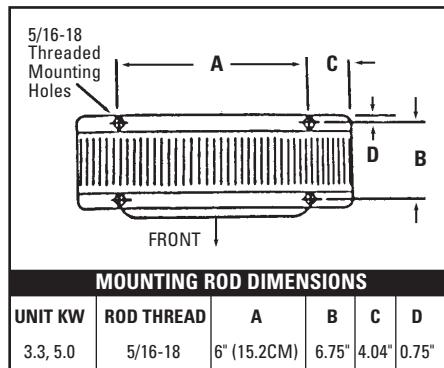


Figure 3. Horizontal discharge rod spacing

# Installation Instructions

## Vertical Delivery

In buildings with high ceilings or bays, vertical delivery unit heaters are recommended to produce comfort in central areas. They are best used when the perimeter heat loss is adequately controlled. In combination with horizontally discharged units, they aid in providing good air mixture (See Figure 4).

Vertical discharging units are mounted high above machinery, assembly lines, etc.

In an application where only vertical discharging units will be used, the air streams must overlap to blanket outside walls and provide good heat distribution (See Figure 5).

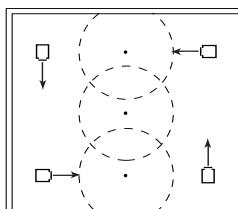


Figure 4.

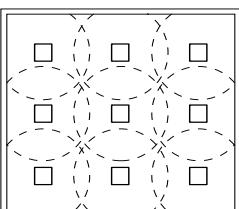


Figure 5.

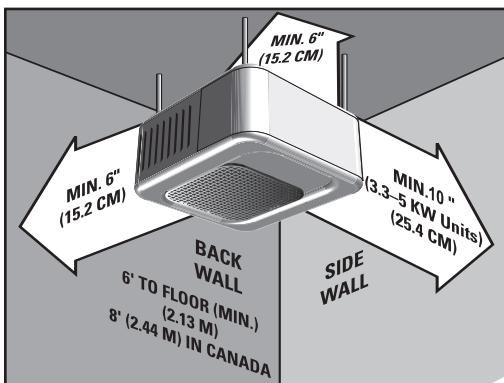


Figure 6. Ceiling mount. Vertical mounting clearances.

## General Safety Information

The ceiling or wall on which the heater is to be mounted must be of adequate strength to support the heater. Plaster or suspended ceilings will not support this type of heater. For greater stability, we recommend the use of threaded rods.

Do not mount the heater where volatile liquids or gases will be present or where it will be exposed to rain or mist. All combustible materials should be kept at least 3 feet away from front of the heater.

In an area where the air temperature will be maintained at less than 68°F, the heater should be mounted in a position that will not blow directly on people working in the area.

A minimum clearance for each heater (both horizontal and vertical mount) is listed in Figure 6. Please follow these recommendations when mounting to avoid potential problems with the function and safety of the heater.

## Mounting the CEH Unit Heater

**CAUTION: THE CEILING OR WALL MOUNTING STRUCTURE AND ANCHORING PROVISIONS MUST BE OF SUFFICIENT STRENGTH TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKETS**

### Vertical Discharge (See Figure 6 for minimum clearances)

1. Install four 5/16-18 threaded rods into the threaded holes in the back of the heater and secure in place using lock (jam) nuts (Figure 7).
2. Attach the four mounting rods to ceiling or overhead structure and anchor securely.

*NOTE: When mounting for vertical discharge, position unit so that access door opens away from nearest wall. This permits maximum access to wiring compartment (Figures 2 & 6).*

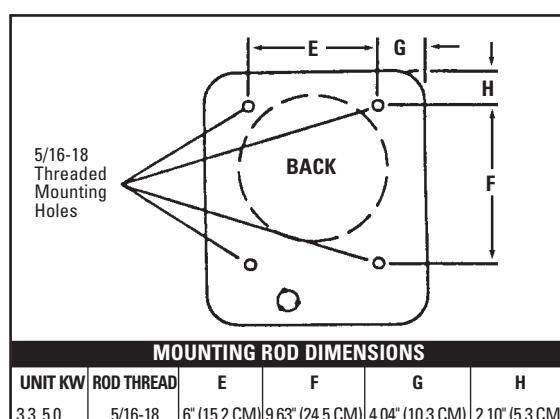


Figure 7. Vertical discharge rod spacing

## Operation and Maintenance

### How to operate your heater

Turn your built-in or wall thermostat to the desired setting. The heater will run for approximately twenty seconds before the fan comes on. The heater will then run until the thermostat setting is reached. Fan will continue to run with elements shut off for approximately seventy seconds and then will shut off. This cycle will continue as needed based on thermostat setting. Do not use breaker panel or fuse box to control heater. Be sure power to heater is constant all the time.

### Maintenance

1. Shut off circuit breaker to heater.
2. Remove front diffuser grill or 3 of the center louvers in front of fan area.
3. Using a compressor, blow air through the outer cabinet louvers and finned element areas. (Do not touch sharp surfaces on elements). While holding fan blade (to avoid damage or bending) carefully blow inside the fan motor area.
4. Carefully wipe off the fan blade without damaging or bending it.
5. Reinstall front diffuser or air vanes.
6. Restore power to heater.



**WARNING!**  
**Risk of Electrical Shock.** Turn off all power at the electrical panel board supplying power to the heater before doing any electrical wiring.

**WARNING!**  
**Overheating or fire may occur. DO NOT place the heater behind doors.**

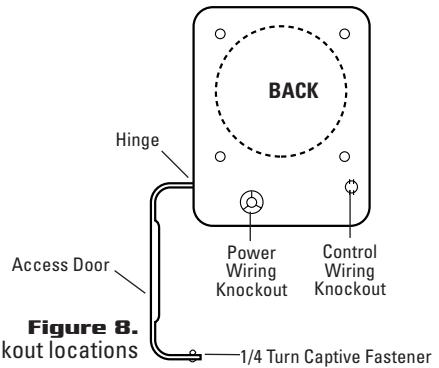
# Wiring Instructions

**CAUTION: TO AVOID ELECTRICAL SHOCK, BE SURE ELECTRICITY IS TURNED OFF AT ELECTRICAL PANEL BOARD BEFORE WIRING. ALL WIRING MUST BE DONE IN ACCORDANCE WITH LOCAL CODES AND THE HEATER MUST BE GROUNDED AS A PRECAUTION AGAINST POSSIBLE ELECTRIC SHOCK. IN ABSENCE OF LOCAL CODES, FIELD WIRING TO THE UNIT SHALL COMPLY WITH CURRENT PROVISIONS OF THE AMERICAN NATIONAL ELECTRICAL CODE OR YOUR NATIONAL ELECTRICAL CODE, AS APPLICABLE.**

**NOTE:** Connect heater only to a line with the voltage and frequency specified on the nameplate.

## Branch Circuit Connections (Power)

1. Wiring compartment access door is hinged. To open, turn single screw on the side 1/4 turn (see Figure 8). Do not try to remove screw.
2. A knockout is provided in the back of the unit for field wiring (See Figure 8). This is a multiple diameter knockout. Use the diameter that fits the required conduit size.
3. A ground terminal is provided near the junction block for field wiring. The ground should be connected before any other connections.
4. The junction block is equipped with box terminals sized to accept the correct power supply wire. Wire rated at 600 volts and 75°C is satisfactory for branch circuit connections. Either **copper** or **aluminum** conductors may be used. NOTE: the center box terminal on the three pole junction block is used only for 3-phase operation.
5. Each heater has a wiring diagram on the inside of the access door. Consult this diagram before making any field connections.



**Figure 8.**  
Knockout locations

## CAUTION – READ THESE INSTRUCTIONS CAREFULLY WHEN USING ALUMINUM WIRING

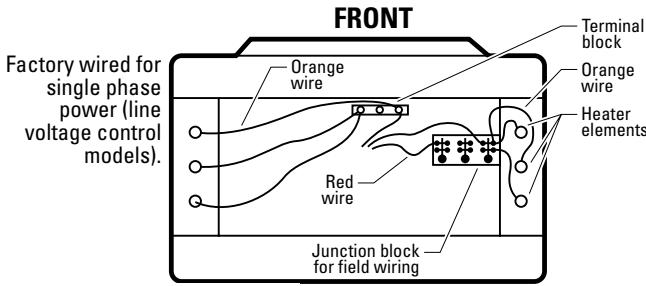
1. Carefully strip insulation from aluminum conductors and coat ends of conductors with suitable corrosion inhibitor ("Pentrox A" or equivalent).
2. Wire brush aluminum surface, removing corrosion; re-coat with corrosion inhibitor.
3. Connect aluminum wiring and tighten connection securely. CAUTION: Do not exceed pressure needed for making a typical copper connection.
4. Coat entire connection with inhibitor.
5. All connections using aluminum conductors should be periodically re-checked for tightness.
6. NOTE: DO NOT JOIN ALUMINUM CONDUCTORS DIRECTLY TO COPPER.

**DUAL RATED 240/208 VOLT MODELS:** All 240 volt models may be operated at 208 volts with a corresponding reduction in output. When the heater is connected to a 208 volt power supply, disconnect the transformer lead from the terminal marked 240V and connect it to the terminal marked 208V. 277 volt units may only be used on single phase circuits. 480 volt units may only be used on three phase circuits.

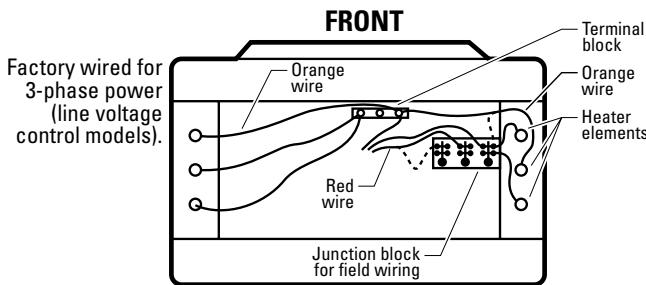
## 3-Phase Connections

Single or 3-phase power connections may be used on all 208 and 240/208 volt, 3.3–5 KW models. These units come factory wired for single-phase power but may be wired for 3-phase power by reconnecting two wires. This is done as follows:

### 1. Models with Line Voltage Control (See Figures 9 & 10)

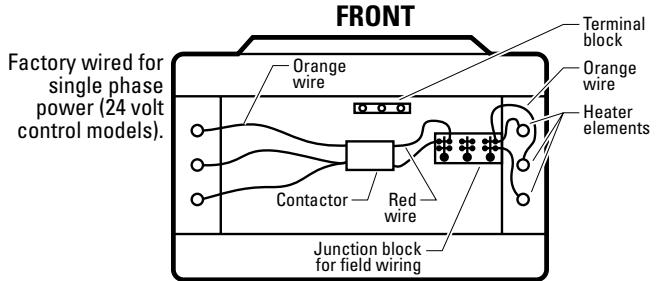


**Figure 9.** FRONT BACK

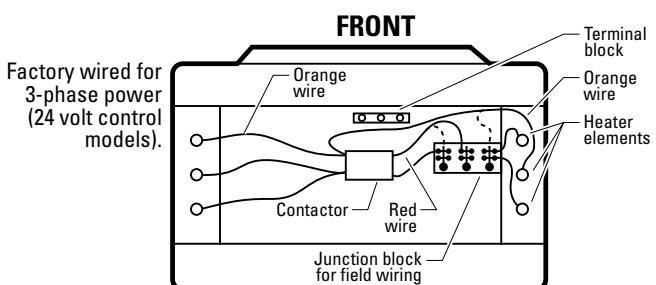


**Figure 10.** FRONT BACK

- a. Disconnect the orange wire from the junction block terminal and connect it to the orange wire on the small terminal block and,
  - b. Disconnect the red wire from the junction block and connect it to the terminal in the center of the block.
2. **Models with 24 Volt Control (see Figures 11 & 12)**
    - a. Disconnect the orange wire from the junction block terminal and connect it to the orange wire on the contactor terminal and,
    - b. Disconnect the red wire from the junction block and connect it to the terminal in the center of the block.



**Figure 11.** FRONT BACK



**Figure 12.** FRONT BACK

**NOTE:** Supply wires must feed direct from breaker to junction block. Thermostat wires connect to terminal board. See wiring diagrams for your specific model.

## Wiring Instructions

### Control Voltage Wiring

1. A knockout is also provided in the back of the unit for control wiring. This knockout is sized for 1/2" conduit. (see Figure 13)
2. Thermostat wire shall be as follows:
  - a. Line voltage control models: Use NEC Class 1, 600V, 90°C, AWG #10 wire with copper conductor or same gauge wire as supply line.
  - b. 24 volt control models (B package): Use NEC Class 1, 600V, 90°C, AWG #18 wire with copper conductor.  
Use H1 + P1, terminals for connection (Do not use jumpers).
3. Install wall thermostats in accordance with the installation instructions supplied with the thermostat.

**NOTE:** Do not locate thermostat in an area exposed to unusual temperature conditions or poor air circulation.

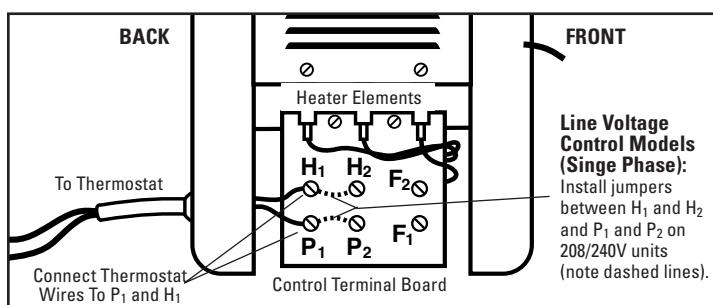
**NOTE:** a. Line voltage control models of 3.3KW and 5.0KW ratings that are 208 and 240 volt, wired for 3-phase operation, should not be used with a wall thermostat. This applies to the following models:

CEH-003-M      CEH-003-P      CEH-005-M      CEH-005-P

*These models come factory wired for single phase. When these models are converted in the field to 3-phase, DO NOT USE A WALL MOUNTED THERMOSTAT. Thermostat control for 3-phase hookup should be provided by a CEK-TB2 (built-in thermostat).*

b. When using model number CEH-005-M wired single phase (factory wired) use the following thermostats:  
Wall Mount – C611-25,  
Built-In – CEK-TB2 (two-stage thermostat)

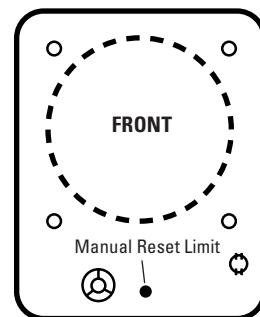
4. Connect the thermostat wires to terminals H1 and P1 as shown in Figure 13. On 208 and 240 volt, single-phase models with line voltage control, (Not B package models) install jumpers as shown in Figure 13.



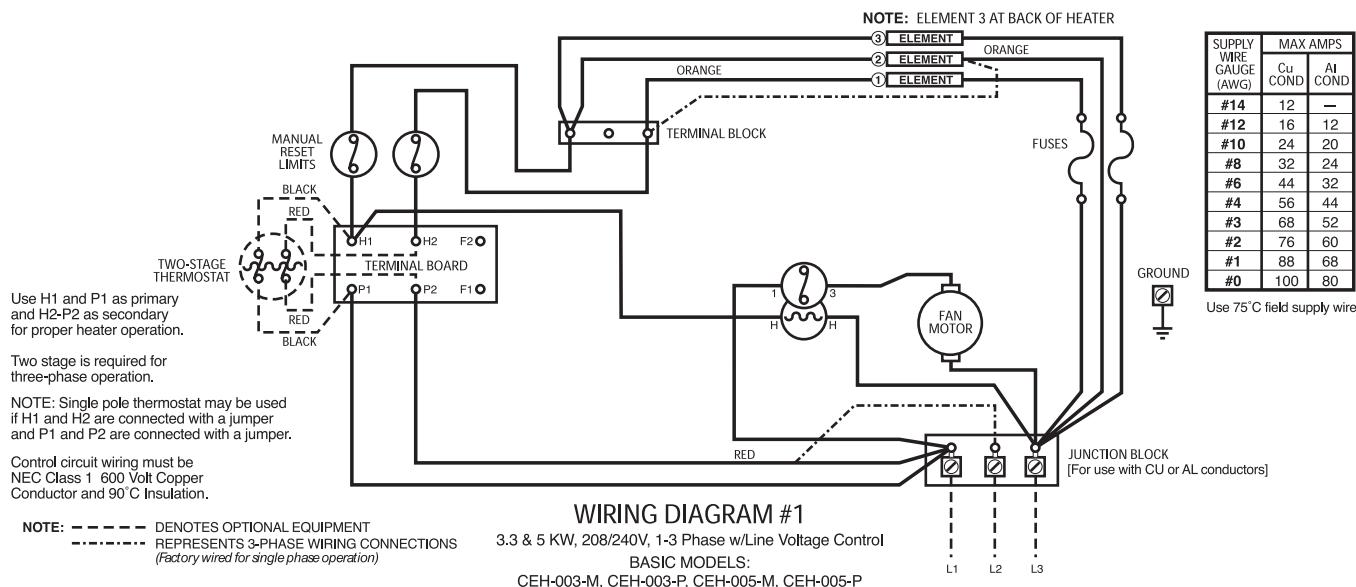
**Figure 13.** Thermostat wiring connections

**Figure 14.**  
Manual reset limit

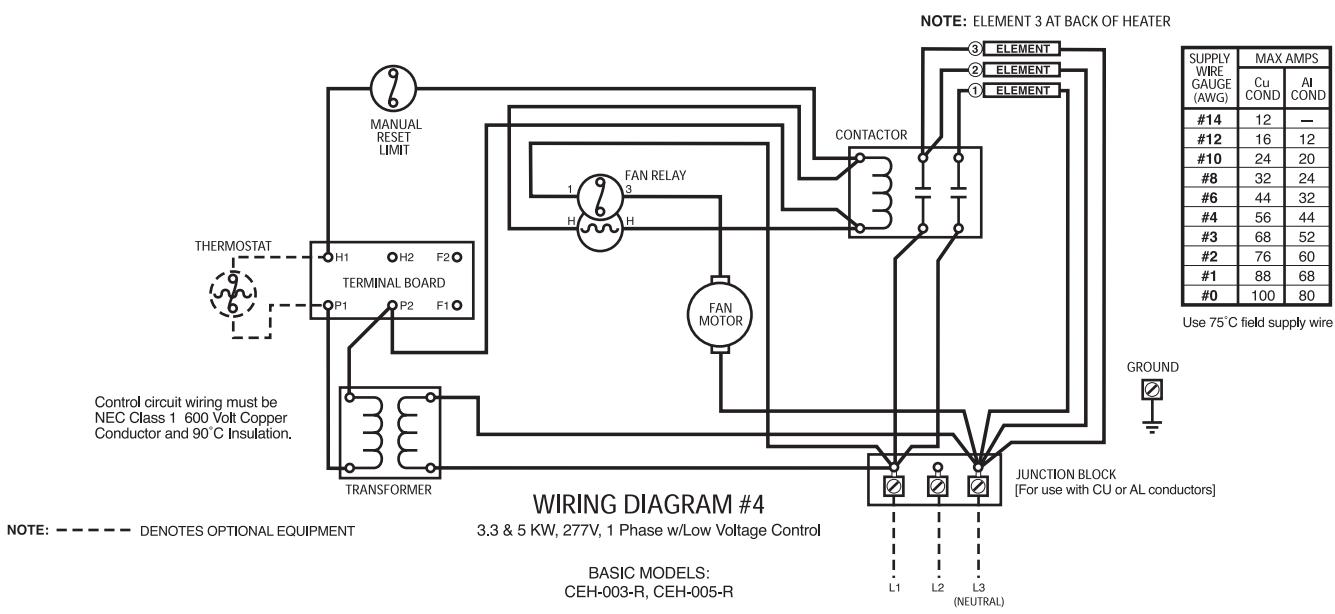
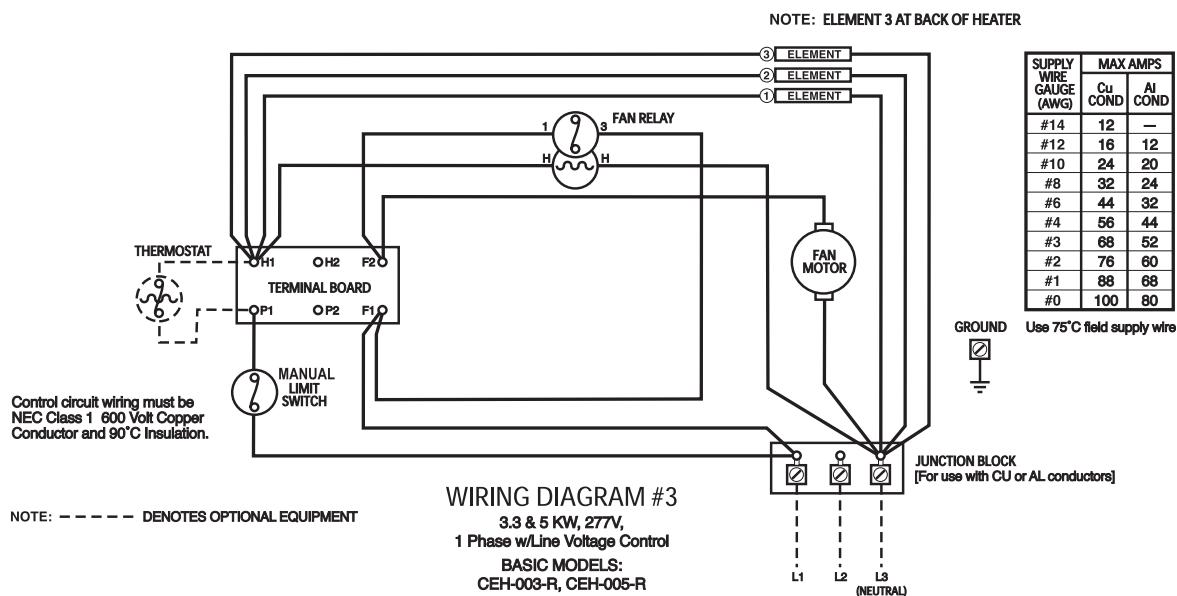
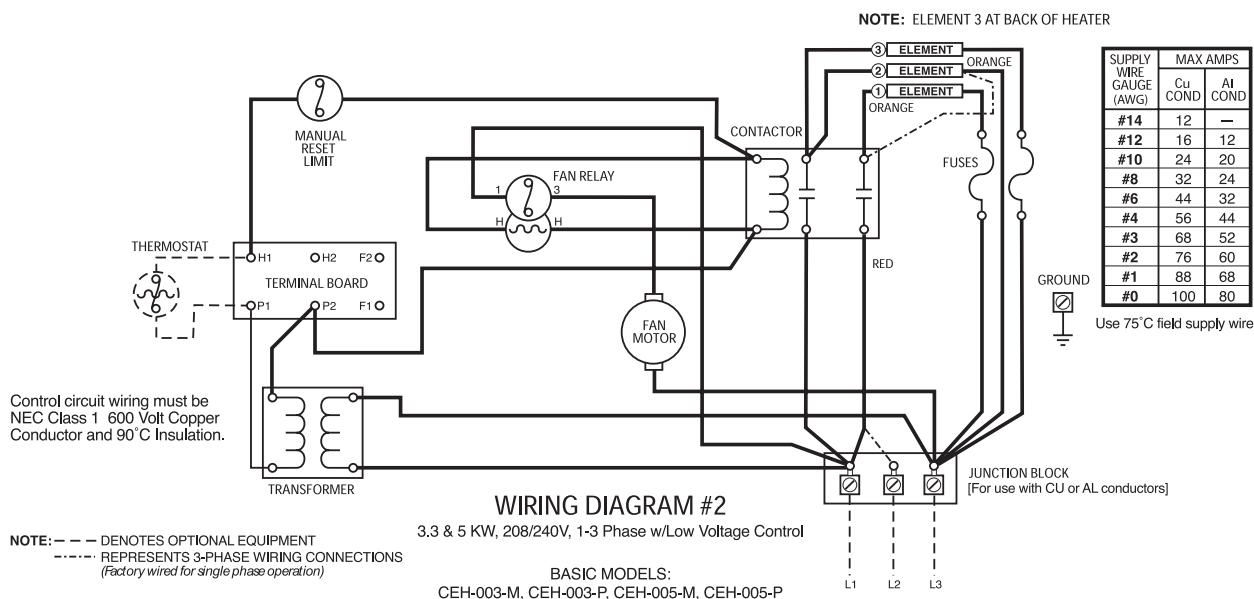
A manual reset thermal limit is factory installed on all models. The limit is located on the front of the heater. The manual reset limit will not reset until the button is pushed and heater has cooled down. (208/240V line voltage control heaters use two manual reset limits)



## Wiring Diagrams

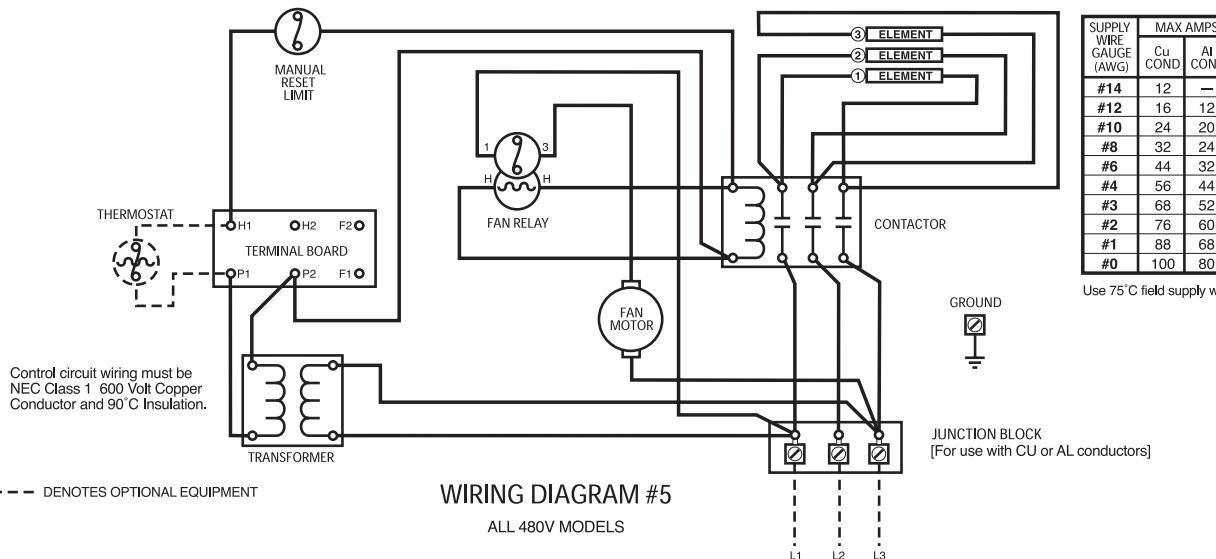


## Wiring Diagrams



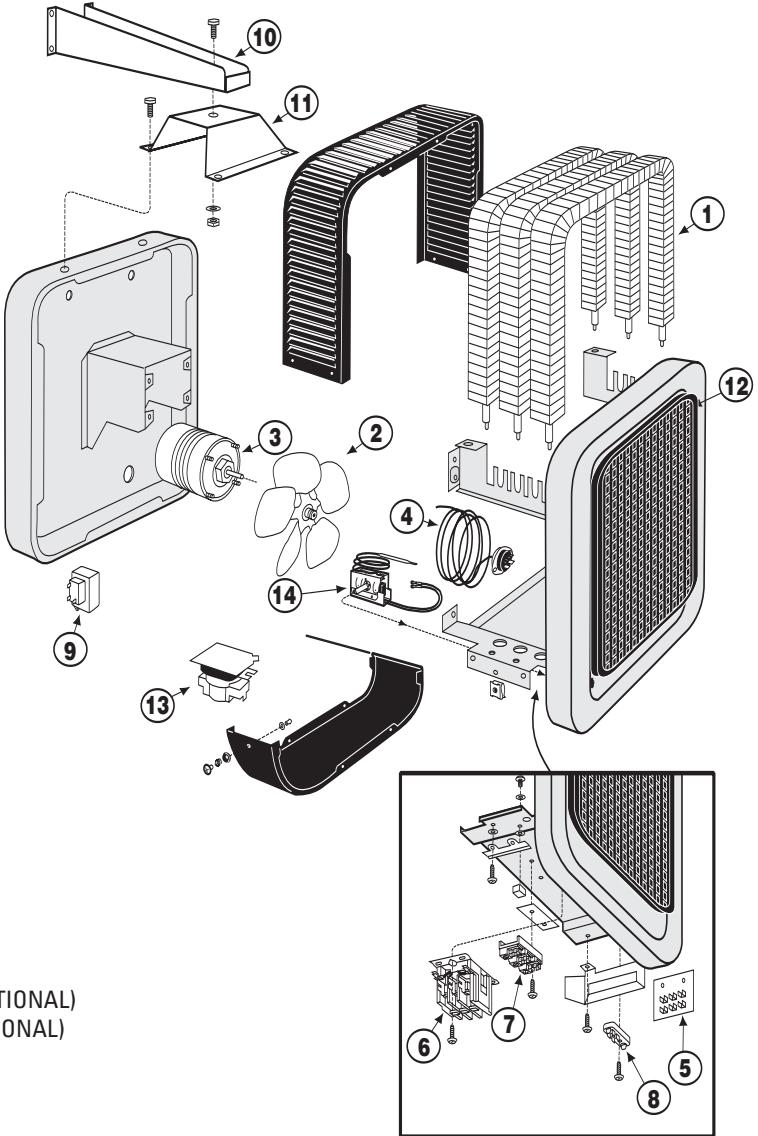
## Wiring Diagrams

NOTE: ELEMENT 3 AT BACK OF HEATER



## Parts List

1. 402023 ELEMENT, CEH-003-M  
402045 ELEMENT, CEH-003MB  
402024 ELEMENT, CEH-003-P  
402046 ELEMENT, CEH-003-PB  
402025 ELEMENT, CEH-003-R  
402049 ELEMENT, CEH-003RB  
402026 ELEMENT, CEH-003-SB  
402027 ELEMENT, CEH-005-M  
402028 ELEMENT, CEH-005-P  
402048 ELEMENT, CEH-005-PB  
402029 ELEMENT, CEH-005-R  
402030 ELEMENT, CEH-005-SB
2. 001601 FAN BLADE, CEH-003 & CEH-005
3. 051408 FAN MOTOR, CEH-003-M, P & CEH-005-M, P  
051409 FAN MOTOR, CEH-003-R & CEH-005-R  
051414 FAN MOTOR, CEH-003-S & CEH-005-S
4. 050323 LIMIT, CEH-003, CEH-005, 208 & 240 VOLT  
WITH LINE VOLTAGE CONTROL  
050326 LIMIT, CEH-005M, P  
050327 LIMIT, CEH-003-PB, MB, R & SB, CEH-005-PB,  
MB, R & SB
5. 052403 TERMINAL BOARD
6. 052501 CONTACTOR, ALL UNITS WITH AN "S" SUFFIX  
052502 CONTACTOR, MB, PB (OPTIONAL 24 VOLT CONTROL)
7. 052402 JUNCTION BLOCK, CEH-003, CEH-005
8. 052401 TERMINAL BLOCK
9. 052601 TRANSFORMER, 240/208 VOLT  
052603 TRANSFORMER, 480 VOLT
10. 09670 CEK-WM, WALL MOUNTING ARM KIT (OPTIONAL)
11. 09660 CEK-M1, 3.3-5.5 KW HAT BRACKET (OPTIONAL)
12. 410102 AIR DIFFUSER, 3.3 - 5.0 KW
13. 053304 FAN DELAY RELAY - 24 VOLT  
050520 FAN DELAY RELAY - 240 VOLT
14. 09610 CEK-TB1, SINGLE POLE INTEGRAL THERMOSTAT (OPTIONAL)  
09615 CEK-TB2, TWO STAGE INTEGRAL THERMOSTAT (OPTIONAL)



**IMPORTANT:** When ordering replacement parts, specify the heater "Model Number" and "Product Date Code" shown on unit rating plate or label found inside access door. Select appropriate "Part No." from this sheet for each part requested. Consult your local distributor or call Cadet at 360.693.2505. Specifications or designs are subject to change or discontinuance without notice or without incurring obligation.

## Troubleshooting Chart

**CONSULT LOCAL ELECTRICAL CODES TO DETERMINE WHAT WORK MUST BE PERFORMED BY QUALIFIED ELECTRICAL SERVICE PERSONNEL**

Symptom	Problem	Solution
Heater does not operate.	1. Voltage not correct for application. 2. In line thermostat used.  3. Heater is or has been blocked. 4. Thermostat set too low. 5. Circuit breaker is off. 6. Defective manual reset.	1. Check voltage with voltmeter and/or consult an electrician. 2. Thermostat wires to terminal board; supply wires to junction block (see wiring diagram). 3. Remove obstruction. Push manual reset in front. 4. Turn knob past sound of click. 5. Turn circuit breaker on. 6. Replace manual reset.
Element heats, fan does not operate.	1. Defective time delay switch. 2. Bad motor or wire connection. 3. Fan hitting or rubbing.	1. Replace the delay switch. 2. Replace motor and/or check wire connection. 3. Adjust blade as needed.
Fan operates, but does not discharge warm air.	1. Manual reset limit tripped. 2. Defective heater elements. 3. Wire loose from elements.	1. Allow heater to cool, then push reset button. 2. Check with ohmmeter and replace if needed. 3. Check and correct loose wire.
Heater does not shut off.	1. Heat loss from area is greater than heater capacity. 2. Defective thermostat.	1. Close doors or windows. (See "Operation & Maintenance" section for instructions). 2. Replace thermostat.
Heater discharges smoke.	1. Dust, dirt and lint accumulated inside the heater. 2. Jammed fan blades.	1. Clean heater. (See "Operation & Maintenance" section for instruction).  2. Remove obstruction.
Fan blades do not turn.	1. Manual reset limit tripped. 2. Jammed fan blades. 3. Defective motor.	1. Remove obstruction. Once heater has cooled, push reset button. 2. Remove obstruction. 3. Replace fan motor.
Manual reset limit trips repeatedly.	1. Overheating. 2. Overheating at shutdown. 3. Overheating from excessive dust, dirt or lint particles. 4. Overheating due to location elevation. 5. Power interruptions.	1. Check all clearance requirements. 2. Discontinue use of breaker to control heater, or replace time delay switch. 3. Clean heater. (See "Operation and Maintenance" section for instructions)  4. Location elevation exceeds recommended 7500 feet.  5. Power to heater needs to be constant.

## Warranty

### **Warranty Information**

**Maintenance:** For safer operation and to prolong the life of the heater, it is necessary to follow the maintenance instructions included with each heater. Failure to properly maintain the heater will result in the warranty being voided. All warranties offered to original consumer only. Warranty instructions included with each heater.

### **All Cadet Products**

**LIMITED ONE-YEAR WARRANTY:** LIMITED ONE-YEAR WARRANTY: Cadet Manufacturing Co. will repair or replace any Cadet product, including thermostats, found to be defective or malfunctioning from first date of purchase through the first year.

### **Extended Product Warranties**

#### **Model CEH**

**LIMITED FIVE-YEAR WARRANTY:** Cadet Manufacturing Co. will repair or replace any Cadet Unit Heater (CEH) element or motor found to be defective or malfunctioning from first date of purchase through the fifth year.

#### **THESE WARRANTIES DO NOT APPLY:**

1. To conditions resulting from improper installation or incorrect supply voltage;
2. To conditions resulting from improper maintenance, misuse, abuse, accident, or alteration;
3. To service calls, or any warranty labor not performed at the Cadet Manufacturing facility;
4. If the date of manufacture cannot be determined;
5. To freight damaged products.

**CADET SHALL NOT BE LIABLE FOR DAMAGES SUCH AS PROPERTY DAMAGE AND/OR INCIDENTAL EXPENSES RESULTING FROM BREACH OF THESE WRITTEN WARRANTIES OR ANY IMPLIED WARRANTY.**

**These warranties give you specific legal rights, and you may also have other rights which vary from state to state. Cadet neither assumes, nor authorizes anyone to assume for it, any other obligation or liability in connection with these electric heaters or any part of such heaters.**

**If the product should become defective during the warranty period, contact Cadet Manufacturing Co. at 360-693-2505 for instructions on how to have the repair or replacement processed. Products returned without authorization will be refused.**

### **Parts and Service**

**Contact Cadet for information on parts or service.**